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APPEAL BRIEF

Applicant	:	Archoff, et al.
App. No	:	09/782,586
Filed	:	February 12, 2001
For	:	SYSTEM AND METHOD FOR RECONCILING TRANSACTIONS BETWEEN A REPLICATION SYSTEM AND A RECOVERED DATABASE
Examiner	:	Chongshan Chen
Art Unit	:	2162

CERTIFICATE OF MAILING

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Sir:

In accordance with the Notice of Appeal filed on August 29, 2005, Applicant submits this Appeal Brief.

The Appellants appeal the rejection of Claims 1-19 and 21-34, which were rejected in the Final Office Action dated June 28, 2005 in the above-captioned patent application.

This Appeal Brief is being filed in accordance with the rules of 37 C.F.R. § 41.37 and includes a Claims Appendix, an Evidence Appendix, and a Related Proceedings Appendix.

An oral hearing is hereby requested.

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I. REAL PARTY IN INTEREST

The real party in interest is the assignee or record, Quest Software, Inc.

II. RELATED APPEALS AND INTERFERENCES

The Appellants know of no other appeals or interferences which will directly affect, be directly affected by, or have a bearing on the Board's decision in this Appeal.

III. STATUS OF CLAIMS

Claims 1-19 and 21-34, as listed the Claim Appendix, remain pending and are the subject of this Appeal.

On June 30, 2004, when responding to an Office Action mailed on March 9, 2004, Applicant canceled Claim 20.

On August 29, 2005, the Examiner finally rejected pending Claims 1-19 and 21-34.

IV. STATUS OF AMENDMENTS

No amendments were made in response to the Final Office Action.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The present application includes five independent claims. Each independent claim is paraphrased below, with citations to corresponding portions of the specification and drawings as required by 37 C.F.R. § 41.37(c)(1)(v).

These citations are provided in order to illustrate specific examples and embodiments of the recited claim language, and not to limit or interpret the claims. Furthermore, a citation to a specific paragraph or appendix in the following claim summaries should be treated as a citation to all lines of that paragraph or appendix.

Claims 1, 2, 17, 26, and 34 are independent claims, however, before discussing each of the claims individually, Applicant has provided a brief overview.

Brief Overview

With reference to Figure 1, the claims are directed to systems and methods for synchronizing two systems – a source system 105 and a target system 110. To ensure synchronization, a replication system 115 captures changes made to the source system 105 and forwards these changes to the target system 110.

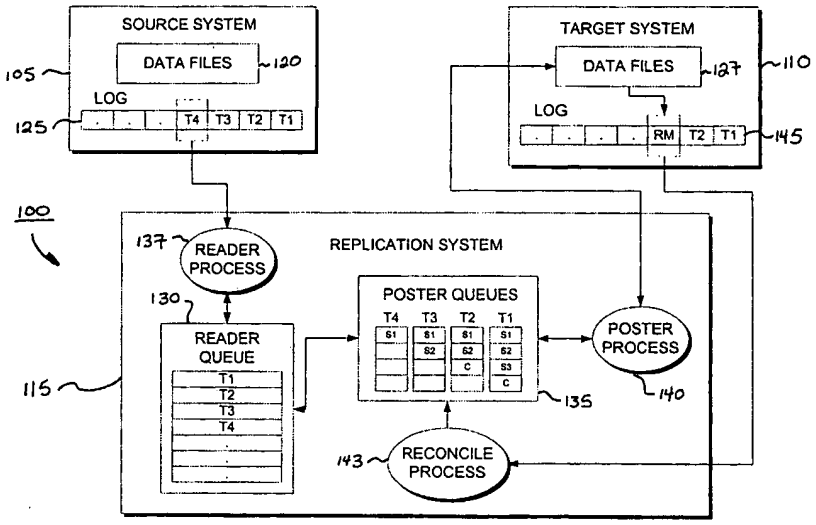

FIG. 1

The replication system 115 stores the changes made to the source system 105 in a poster queue 135 until the replication system 115 can apply the changes to the target system 110. For example, during periods where the target system 110 is temporarily unavailable due to maintenance or inaccessiblity, the changes remain in the poster queue 135 until the target system 110 becomes available. Once the target system 110 becomes available, the replication system 115 applies the changes pending in the poster queue 135 to the target system 110.

Unsynchronizing events such as a crash of the target system 110, however, can cause problems when replicating data from the source system 105 to the target system 110. In such instances, duplicative or stale transactions can exist in the poster queue 135 after recovery of the target system 110.

Thus, the pending claims are directed to a replication system 115 that deletes stale transactions after recovery of the target system 110.

For example, assume that the source system 105 and the target system 110 represent databases of bank accounts. In addition, assume that after the target system 110 crashes, the source system 105 remains available and continues to process transactions. In this example, a user deposits $100 into his account. This $100 deposit transaction will be applied to the person's account in the source system 105 as the source system 105 remains available.

In addition, replication system 115 stores the $100 deposit transaction in the poster queue 135 so that that $100 deposit can be applied to the target system 110 once the target system 110 becomes available.

In this example, the crash of the target system 110 requires recovery of the target system 110. One way of recovering the target system 110 is to physically transfer a copy of the source system 105 on a recording medium to the location of the target system 110. This copy of the source system 105 is then used to restart the target system 110.

In this example, the copy of the source system 105 is made after the completion of the $100 deposit. Consequently, the user account in the recovered target system 110 will show that $100 has been deposited into the account.

Focusing now on the replication system 115, in this example, the $100 deposit transaction is still pending in the poster queue 135 as the target system 110 has been unavailable since it crashed. Once the target system 110 becomes available, the replication system 115 will want to apply the $100 deposit transaction pending in the poster queue 135 to the target system 110 such that the user's account will be updated twice. As a result, the user account in the recovered target system 110 will indicate that an additional $100 deposit has occurred resulting in an overall increase of $200.

While the user may enjoy this double deposit, the bank will not. Also, the amount in the user account of the target system 110 ($200) will differ from the amount of the user

account in the source system 105 ($100). That is, the replication system 115 that seeks to keep the two systems synchronized will cause an error.

This error occurs because the modified data in the source system 105 was copied to the target system 110 while information about the modified data remained in the reconcile poster 135. See for example, the patent application at page 10, lines 20-31.

The pending claims address this problem by claiming a replication system 115 that deletes duplicative or "stale" transactions from the poster queue 135 after recovery of the target system 110. See for example, page 11, lines 1- 8.

Independent Claim 1

Claim 1 is directed to a device for performing replication between a source system and a target system. With reference to Figure 1, the device is a replication environment 100 that comprises a source system 105, a replication system 115 and a target system 110. The replication system 115 captures changes made to source system 105 and forwards those changes to the target system 110, thereby synchronizes the data of the source system 105 and the data of the target system 110. See, e.g., page 5, line 27 to page 6, line 6. The device comprises:

- a source system (see, e.g. 105 in Figure 1) having data files 120, and log files 125 storing replication transactions corresponding to changes made to the data files (see, e.g., page 7, lines 3-12);
- a recovered target system 110 wherein the recovered target system 110 comprises a rolled back copy of the data files in the source system 105 and wherein the rolled back copy of the data files comprises data that is associated with at least one replication transaction stored in the log files 125 (see, e.g., page 13, lines 29 to page 14, line 8);
- a replication system 115 performing replication of at least portions of the data files of the source system 105 to the recovered target system 110 by reading the log files and posting the changes from the log files 125 to the recovered target

system 110, the replication system 115 comprising (see, e.g., page 5, line 30 to page 8, line 6):

- transaction-level poster queues 135, each poster queue 135 storing statements corresponding to a particular replication transaction from the source system 105 (see, e.g., page 8, lines 26-29), and
- a reconcile process 143 which purges replication transactions from the poster queues 135 when the replication transactions have already been applied to the recovered target system 110 (see, e.g., page 10, line 20 to page 11, line 8); and

- wherein the replication system 115 performs the replication transactions by rolling forward at least some of the information rolled back during the recovery of the recovered target system 110 such that the purged replication transactions in the poster queues 135 are not applied while rolling forward (see, e.g., page 14, lines 5-9, page 15, lines 8-11, and page 17, line 27 to page 18, line 16) such that the source database 120 remains available during recovery of the recovered target database 127 (see e.g., page 12, lines 20-25).

Independent Claim 2

Claim 2 is directed to a replication system 115 that replicates at least portions of the data contained in a source database 120 to a target database 127. The replication system 115 (see, e.g., page 5, line 30 to page 8, line 6) comprises:

- poster queues 135 which store information corresponding to changes made to at least portions of a source system 105 (see, e.g., page 8, lines 26-29);
- at least one poster process 140 which reads the information stored in the poster queues 135 and generates commands interpretable by a target system 110 and designed to change the target system 110 to reflect the changes made to the at least portions of the source system 105 (see, e.g., page 9, lines 17-23);

- instantiation or recovery process 200 of the target system 110 that rolls back information previously applied to the target system 110 such that the target system 110 comprises at least a copy of some of the information stored in the poster queues 135 (see, e.g., page 13, lines 4-11 and page 14, lines 2-8); and
- a reconcile process 143 which purges stale information stored in the poster queues 135, the stale information corresponding to changes made to the target system 110 during the instantiation or recovery thereof (see, e.g., page 10, line 20 to page 11, line 8); and wherein the poster queues 135 roll forward at least some of the information rolled back during the recovery of the recovered target system 110 such that the purged stale information is not applied while rolling forward (see, e.g., page 14, lines 5-9, page 15, lines 8-11, and page 17, line 27 to page 18, line 16) and wherein the source system 105 remains available during instantiation or recovery of the target database 127 (see e.g., page 12, lines 20-25).

Independent Claim 17

Claim 17 is directed to a method of recovering or instantiating a target database 127 during replication from a source database 120 to the target database 127, (see, e.g., page 5, line 30 to page 8, line 6) the method comprising:

- creating a target database 127 that has a copy of data from a source database 120 (see, e.g., page 8, lines 18-20);
- logging replication transactions in a replication system 115 wherein the replication transactions are associated with changes made to the source database 120 (see, e.g., page 7, lines 8-10);
- applying the replication transactions to the target database 127 to maintain in the target database 127 a copy of the source database 120 (see, e.g., page 8, lines 18-20);

- identifying an unsynchronizing event associated with the target database 127 (see, e.g., page 10, lines 25-28);
- recovering the target database 127 by rolling back information previously applied to the target database 127 such that the recovered target database 127 contains a copy of at least some of the changes represented by the replication transactions contained in the replication system 115 (see, e.g., page 13, lines 29 to page 14, line 8);
- reconciling the recovered target database 127 with the replication transactions contained in the replication system 115, thereby purging stale replication transactions from the replication system 115 (see, e.g., page 10, line 28 to page 11, line 8); and
- restarting replication by rolling forward at least some of the information rolled back during the recovery of the target database 127 such that the purged stale replication transactions are not applied during replication (see, e.g., page 14, lines 5-9, page 15, lines 8-11, and page 17, line 27 to page 18, line 16) and wherein the source database remains available during recovering, reconciling and restarting (see e.g., page 12, lines 20-25).

Independent Claim 26

Claim 26 is directed to a method of reconciling transactional information stored in a replication system 115 with a recovered database 127 (see, e.g., page 10, line 28 to page 11, line 8), the method comprising:

- parsing a log file 145 of a recovered database 127 to determine a placement indicator of a recovery flag (see, e.g., page 14, lines 9-10);
- rolling back information previously applied to a recovered database 127, wherein the recovered database 127 comprises at least some data that is also represented by transaction data that exists in the log file 145 (see, e.g., page 13, lines 4-11 and page 14, lines 2-8);

- reading the transaction data corresponding to changes made to a source database 120 to determine placement indicators of completed transactions (see, e.g., page 15, lines 14-25);
- purging the transactional data when the placement indicator corresponding to the completed transaction occurred before the placement indicator of the recovery flag (see, e.g., page 16, lines 1-13); and
- replicating the transactional data to the recovered database 127 by rolling forward at least some of the information rolled back during the recovery of the recovered database 127 such that the purged transaction data are not applied during replication replication (see, e.g., page 14, lines 5-9, page 15, lines 8-11, and page 17, line 27 to page 18, line 16) such that the source database remains available while replicating the transactional data to the recovered database (see e.g., page 12, lines 20-25).

Independent Claim 34

Claim 34 is directed to a device comprising:

- a source system 105 having a source database management system (SDBMS) which governs the storage of data within the source system 105 and creates a log file 125 tracking changes made to the source system 105 (see, e.g., page 7, lines 3 to 18);
- a target system 110 having a target database management system (TDBMS) which governs the storage of data within the target system 110 and creates a log file 145 tracking the changes made to the target system 110 wherein the target database management system is configured to recover the target system 110 by rolling back portions of previously applied information (see, e.g., page 9, lines 20-23 and page 13, line 29 to page 14, line 8); and
- a replication system 115 having queues 135 and communicating with the log file 145 of the TDBMS and the log file 125 of the SDBMS, thereby purging

from the queues 135 the replication transactions applied after the beginning, but before the completion, of the recovery of the target system 110 (see, e.g., page 10, line 28 to page 11, line 8), wherein the replication transactions correspond to the changes made to the source system 105 wherein the replication system 115 is configured to roll forward at least some of the information rolled back during the recovery of the target system 110 such that the purged replication transactions are not applied during replication (see, e.g., page 14, lines 5-9, page 15, lines 8-11, and page 17, line 27 to page 18, line 16) such that the source system 105 remains available during recovery of the target database 127 (see e.g., page 12, lines 20-25).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The following rejections are to be reviewed on appeal:

1. The rejection of Claims 17-19 under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

2. The rejection of Claims 1-19 and 21-34 under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,640,561 to Satoh et al. ("the Satoh patent") in view of a publication regarding Microsoft's Exchange by Pagano et al. (the "Pagano reference").

VII. ARGUMENT

A. Rejection of Claims 17-19 under 35 U.S.C. § 101

The Examiner rejected Claims 17-19 under 35 U.S.C. § 101 as being directed to non-statutory subject matter. In the rejection, the Examiner states that Clams 17-19 and 21-33 are "not statutory because they merely recite a number of computing steps without producing any tangible result and/or being limited to a practical application within the technical arts."

Independent Claim 17

Applicant respectfully asserts that Claim 17 is patentable as Claim 17 recites useful, concrete and tangible results.

First, it does not appear that the Examiner has taken the position that Claim 17 is directed to a law of nature, physical phenomena or an abstract idea as Claim 17 is clearly directed to a process of purging stale replication transactions from a replication system.

Second, Claim 17 recites tangible results in that it purges stale replication transactions from the replication system such that the purged stale replication transactions are not applied during replication. Thus, Claim 17 clearly recites a useful, concrete, and tangible result.

Third, it appears that the Examiner rejects Claim 17 as not being directed to a practical application within the technical arts. This, however, is not a separate ground for rejection. In Ex parte Lundgren, Appeal No. 2003-2088, Application 08/093,516 (Precedential BPAI Opinion September 2005), the Board of Patent Appeals and Interferences has specifically stated that there is not a separate technical arts test. Lundgren at 9.

Accordingly, Applicant's should not be required to amend Claim 17 to incorporate the "computer-implemented" limitation as requested by the Examiner.

Dependent Claims 18 and 19

Because Claims 18 and 19 depend from Claim 1, the rejection of Claims 18 and 19 are improper for the reasons set forth above for Claim 1 and because of the additional limitations recited therein. However, for the purposes of Applicant's appeal of the rejection under 35 U.S.C. § 101, Claims 18 and 19 stand or fall with Claim 1.

B. Rejection of Claims 1-25 and 34 under 35 U.S.C. § 103

The Examiner rejected Claims 1-19 and 21-34 under 35 U.S.C. §103(a) as being unpatentable over the Satoh patent in view of the Pagano reference.

As an initial matter, Applicant desires to point out that the Satoh patent maintains a replica of a source database. The Satoh patent, however, does not describe how to reconcile the source and replica database if the replica goes off-line and then needs to be recovered.

While the Pagano reference discusses how to recover a database in the event of a system crash or other disaster, the Pagano reference does not provide any teaching regarding applying replication transactions from a source database to a recovered database.

Thus, even if the references could be combined, which they cannot, the combination does not teach the general concept of a replication system that reconciles a source system with a recovered target system.

Furthermore, even if the references could be combined, which they cannot, the combination does not teach a replication system that purges replication transactions before they are applied to a recovered target system.

Independent Claim 1

Claim 1 is directed to a replication system that reads the log files 125 of a source system 105 to identify transactions that alter the source system 105. The replication system 115 then stores these transactions in poster queues 135 (hereinafter the transactions stored in the poster queues 135 will be referred to as replication transactions). The replication system 115 applies the replication transactions to a recovered target system 110.

When the target system 110 fails, the source system 105 remains available. Thus, when a user deposits $100 into his account, the $100 deposit transaction is applied to the user account in the source system 105.

Also, because this transaction has modified the source system 105, the target system 110 needs to be modified in order to maintain consistency. Because the failed target system 110 is currently unavailable, the replication system 115 stores this $100 deposit transaction as a replication transaction in the poster queues 135. In this example, this replication transaction remains pending in the replication system 115 while the target system 110 is unavailable.

Focusing now on the recovery of the target system 110, in order to recover the target system 110, a copy of the source system 105 is used. It is helpful to know that in the source system 105 there are at least two types of transactions – 1) completed transactions and 2) partially completed transactions. At any point in time, the source system 105 will likely have completed some transactions and partially completed other transactions.

Thus, the copied source system 105 used to recover the target system 110 typically has both completed and partially completed transactions. During the recovery process, the partially completed transactions are removed or "rolled-back" such that the partially completed transactions are undone.

The modifications associated with completed transactions, however, remain in the recovered target system 110. In this example, the $100 deposit transaction was completed and thus the modified user account in the recovered target system 110 indicates that an additional $100 exists in the user account.

Focusing now on the replication system 115, the associated $100 deposit replication transaction is still pending in the poster queues 135. If this replication transaction is then applied to the recovered target system 110 an error will occur as the recovered target system 110 has the modified user account therein.

In other words, the replication transaction associated with the $100 deposit is no longer needed as the recovered target system 110 already shows that $100 has been deposited into the user account. Thus, the $100 deposit replication transaction is referred to as a "stale" replication transaction and needs to be purged from the poster queues 135.

None Of The Cited References Have A Recovered Target System That Contains Data Associated With A Pending Replication Transaction

Completed transactions alter the source system 105 and thus, the reconcile system 115 stores a copy of these transactions as replication transactions in the poster queues 135.

After the failure of the target system 110, one way of recovering the target system 110 is to transfer a copy of the source system 105 to the target system 110. The copied source system 105, however, typically has transactions that occurred after the crash of the target system 110.

Also, it is helpful to know that at any point in time, some of the transactions applied to the source system 105 will have been completed while other transactions may have only been partially completed. During the recovery process, the partially completed transactions contained in the copy of the source system 105 are removed or "rolled-back" such that the partially completed transactions are undone. Thus, the recovered target system 110 is a rolled back copy of the source system 105.

In particular Claim 1 states:

> "***a recovered target system*** wherein the recovered target system comprises a rolled back copy of the data files in the source system and ***wherein the rolled back copy of the data files comprises data that is associated with at least one replication transaction stored in the log files***; and"

The rolled-back copy of the source system 105, however, has at least one transaction that was completed. Hence there is a replication transaction pending in the poster queues 135 that is associated with the completed transaction.

For example, data about the $100 deposit transaction is in both the recovered target system 110 and in the log files 125. Thus, the recovered target system 110 has data files that comprise data (the $100 in the user account) that is associated with a transaction in the log files 125 (the $100 deposit replication transaction).

The Applicant respectfully asserts that the Examiner incorrectly states on page 5 of the Final Office Action that the Satoh patent teaches this concept in Figures 1 and 3 and at Column 3, lines 20-50.

Figure 1 of the Satoh patent appears to show an active computer system and a backup computer system. Figure 2 shows changes made to one database are copied to shadow databases.

Column 3, lines 20-50 of the Satoh patent appear to describe the general concept of copying transactions applied to an active database to a backup system. These transactions are transferred as redo records. When a transaction becomes a committed transaction, the transaction in the redo record is identified and applied to the backup database.

The Satoh patent, however, does not describe the claimed recovered target database. To do so, the Satoh patent would need to teach the recovery of a backup system, which it does not. The Satoh patent would also need to teach that the recovered backup system rolls back partially completed transactions, which it does not. In addition, the Satoh patent would need to teach a recovered backup system wherein the data files comprise data that is associated with a transaction in the redo log, which it does not.

Thus, the Examiner is incorrect in asserting that the Satoh patent teaches the claimed recovered target system as set forth in Claim 1. Furthermore, none of the cited references describe the concept of recovering a target system. None of the cited references describe the concept of rolling back the recovered target system. Still further, none of the cited references describe a recovered target system having data that is associated with a reconcile transaction stored in a log file.

None of the Cited References Teach The Purging Of Stale Reconcile Transactions

Claim 1 is directed to a replication process that purges stale replication transactions when the transactions have already been applied to the recovered target system:

"a reconcile process which ***purges replication transactions from the poster queues when the replication transactions have already been applied to the recovered target system***; and"

The Examiner concedes that the Satoh patent does not disclose a reconcile process that purges replication transactions from the poster queues. To teach this concept, the Examiner relies on the Pagano reference.

While the Pagano reference appears to discuss how to recover a database in the event of a system crash or other disaster, the Pagano reference only describes a single database system. That is, in the Pagano reference there is not a source and a target system.

On page 4 of the Final Office Action the Examiner states:

> "Pagano teaches purging replication transactions from the poster queues when the replication transactions have already been applied to the recovered target system; and wherein the replication system; and wherein the replication system performs the replication transactions by rolling forward at least some of the information rolled back during the recovery of the recovered target system such that the purged replication transactions in the poster queues are not applied while rolling forward such that the source database remains available during recovery of the recovered target database (Pagano, page 3, page 8-11)."

Applicant, however, cannot find any reference in Pagano to replication transactions that have already been applied to a recovered target system. Pagano does not have source and target databases. Thus, Pagano does not have a replication system that maintains consistency between source and target systems. Furthermore, Pagano makes no mention of replication transactions whatsoever. Thus, Applicants respectfully submits that the Examiner has misread the Pagano reference.

Rather, it appears that the disclosure in pages 3 and 8-11 of the Pagano reference describes the rolling back and rolling forward of transactions to recover a database to a particular point. For example the on page 11, the Pagano reference states:

> "When a Microsoft Exchange Server information store or directory is started after abnormal server shutdown – the transaction log file is scanned to see if

there were any incomplete transactions. If there were, these transactions are "rolled back" automatically to the state before they took place. This automatic recovery operation is relatively quick, since only the most recent transactions in the log have to be checked."

These rolled-back transactions, however, are not purged. Rather they are applied to the recovered database. Page 21 of the Pagano reference states:

"When the Information Store starts it will roll forward through all the existing database logs and place the data into the restored Information Store. This will bring the Information Store back to the point of the crash. If successful there will be no loss of data at all."

Applicant is unable to find any discussion in the Pagano reference that teaches that the recovered database contains data such that transactions need to be purged from the logs.

Thus, even if the Pagano reference could be combined with the Satoh patent, which it cannot, the combination would not teach the purging of replication transactions from the poster queues to prevent replication transactions from being applied to the recovered target system.

None of the Cited References Teach a Source System That Remains Available During Recovery

In Claim 1 the source system remains available during recovery of the target system:

"wherein the replication system performs the replication transactions by rolling forward at least some of the information rolled back during the recovery of the recovered target system such that the purged replication transactions in the poster queues are not applied while rolling forward ***such that the source database remains available during recovery of the recovered target database***."

When the database in the Pagano reference fails, the database becomes unavailable until the database is recovered. Because the Pagano only describes one database, the

Pagano reference does not teach the concept of a source database that remains available during recovery of the a recovered target database.

While the Satoh patent describes the synchronization of an active database with a backup database, the Satoh patent does not mention the possibility of the failure of the backup system, let alone what to do when the backup system fails. Thus, even if the Pagano reference could be combined with the Satoh patent, which it cannot, the combination would not teach a source database that remains available during recovery of the recovered target database.

The Satoh Patent And The Pagano References Cannot Be Combined

Section 2143 of the M.P.E.P. states that to establish prima facie obviousness three requirements must be met:

> "To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure."

First, there is no suggestion or motivation to combine the Satoh patent and Pagano reference to obtain a system that both recovers a target system and reconciles the target system with a source system such that stale replication transactions are purged and wherein the source system remains available during recovery and reconciliation of the target system.

Rather, it appears that the Examiner has impermissibly used hindsight derived from the teachings in the present application, and not the teachings of the prior art, to reject the claims. In re Dembiczak, 175 F.3d 994, 999 (Fed. Cir. 1999) (holding the Board impermissibly used hindsight in determining obviousness); See also, M.P.E.P., Sect. 2145, part X.A. In Dembiczak, the Federal Circuit reiterated that a determination of

obviousness cannot simply rely on the inventor's disclosure as a "blueprint" without evidence of a suggestion, teaching or motivation in the prior art. Dembiczak, 175 F.3d 994, 999. Also, according to M.P.E.P. Section 706.02(j), "[t]he teaching and suggestion to make the claimed combination and the reasonable expectation for success must both be found in the prior art and not based on applicant's disclosure."

Second, there must be a reasonable expectation of success. Because neither the Satoh patent nor the Pagano reference teach the existence of inconsistencies that occur when recovering a target database such as the existence of stale replication transactions in a replication system, there doesn't appear to be any expectation of success that the two systems when combined would address the such problems.

Furthermore, because neither the Satoh patent nor the Pagano reference teach how to resolve replication inconsistencies by purging stale replication transactions, there doesn't appear to be any expectation of success that the two systems when combined would address the such problems.

Third, neither the Satoh patent nor the Pagano reference teach all the claimed limitations. Thus, even when combined, the Satoh patent and the Pagano reference would not teach Applicant's claimed invention.

Applicant therefore respectfully submits that Claim 1 is patentably distinguished over the cited references and Applicant respectfully requests allowance of Claim 1.

Claims 2-25

The rejection of Claims 2-25 is improper for the reasons as set forth with respect to Claim 1 and because of the additional limitations recited therein. However, for the purposes of Applicant's appeal of the rejection under 35 U.S.C. § 103, Claims 2-25 stand or fall with Claim 1.

Independent Claim 26

The rejection of independent Claim 26 is improper for the reasons as set forth with respect to Claim 1. In addition, the cited references also do not teach the claimed placement indicators.

The Cited References Do Not Teach the Use Of Two Placement Indicators

Claim 26 is directed to a method of reconciling transactional information stored in a replication system with a recovered database. The claimed method refers to at least ***two*** types of placement indicators – 1) the placement indicator of a recovery flag and 2) the placement indictors of completed transactions. Claim 26 recites as follows:

> "parsing a log file of a recovered database to determine ***a placement indicator of a recovery flag***;...
>
> reading the transaction data corresponding to changes made to a source database ***to determine placement indicators of completed transactions***;"

The first type of placement indicator is a placement indicator for a recovery flag. The second type of placement indictor relates to placement indicators of transactions that have been completed in the source database.

The Examiner, however, asserts that the cited references teach these two different types of placement indicators. Unfortunately, the Examiner provides very little basis for the rejection of Claim 26. Applicant notes, however, that with respect to dependent Claim 23, the Examiner states that the Pagano reference on pages 7-8 teaches a checkpoint. The Examiner asserts that this checkpoint is a recovery marker.

The Pagano reference, however, specifically states that the checkpoint is in indicator of committed transactions, not a recovery marker:

> "The "checkpoint" is referred to as the place marker within the EDB.CHK file that indicates which transactions have been committed." See Pagano reference page 7, paragraph entitled "Checkpoint Files And The 'Checkpoint'".

Thus, the checkpoint in the Pagano reference doesn't appear to be a recovery marker that identifies the point of recovery of a recovered target database. Rather, the checkpoint is used in the Pagano reference determines what transactions have been committed prior to failure of a database. The Examiner also doesn't provide any citations regarding whether the Satoh patent teaches a recovery marker.

Neither the Pagano reference nor the Satoh patent teach two types of placement markers as set forth in Claim 26. Accordingly, even if the Pagano reference could be combined with the Satoh patent, which they cannot, the combination would not teach the claimed two types of placement markers. Therefore, Applicant respectfully requests allowance of Claim 26.

Dependent Claims 27-33

The rejection of dependent Claims 27-33 is improper for the reasons as set forth with respect to Claim 26 and because of the additional limitations recited therein. However, for the purposes of Applicant's appeal of the rejection under 35 U.S.C. § 103, Claims 28-33 stand or fall with Claim 26.

Independent Claim 34

The rejection of independent Claim 34 is improper for the reasons as set forth with respect to Claim 1 and because of the additional limitations recited therein. However, for the purposes of Applicant's appeal of the rejection under 35 U.S.C. § 103, Claim 34 stands or falls with Claim 1.

In view of the foregoing arguments distinguishing Claims 1-19 and 21-34 over the art of record, Applicant respectfully requests that the rejection of these claims be reversed.

Please charge any additional fees, including any fees for additional extensions of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: 10-31-05

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VIII. CLAIMS APPENDIX

1. A device for performing replication between a source system and a target system, the device comprising:

a source system having data files, and log files storing replication transactions corresponding to changes made to the data files;

a recovered target system wherein the recovered target system comprises a rolled back copy of the data files in the source system and wherein the rolled back copy of the data files comprises data that is associated with at least one replication transaction stored in the log files; and

a replication system performing replication of at least portions of the data files of the source system to the recovered target system by reading the log files and posting the changes from the log files to the recovered target system, the replication system comprising:

transaction-level poster queues, each poster queue storing statements corresponding to a particular replication transaction from the source system, and

a reconcile process which purges replication transactions from the poster queues when the replication transactions have already been applied to the recovered target system; and

wherein the replication system performs the replication transactions by rolling forward at least some of the information rolled back during the recovery of the recovered target system such that the purged replication transactions in the poster queues are not applied while rolling forward such that the source database remains available during recovery of the recovered target database.

2. A replication system for replicating at least portions of the data contained in a source database to a target database, the replication system comprising:

poster queues which store information corresponding to changes made to at least portions of a source system;

at least one poster process which reads the information stored in the poster queues and generates commands interpretable by a target system and designed to change the target system to reflect the changes made to the at least portions of the source system;

instantiation or recovery process of the target system that rolls back information previously applied to the target system such that the target system comprises at least a copy of some of the information stored in the poster queues; and

a reconcile process which purges stale information stored in the poster queues, the stale information corresponding to changes made to the target system during the instantiation or recovery thereof; and wherein the poster queues roll forward at least some of the information rolled back during the recovery of the recovered target system such that the purged stale information is not applied while rolling forward and wherein the source system remains available during instantiation or recovery of the target database.

3. The replication system of Claim 2, wherein the information comprises transactions.

4. The replication system of Claim 2, wherein the at least one poster process reads a completion indicator from the poster queues, wherein the completion indicator corresponds to one or more finalized changes made to the source system.

5. The replication system of Claim 4, wherein the completion indicator corresponds to a COMMIT statement.

6. The replication system of Claim 2, wherein the reconcile process employs placement indicators to determine which information stored in the poster queues is stale.

7. The replication system of Claim 6, wherein one of the placement indicators corresponds to a recovery marker placed by the target system, wherein the recovery marker identifies how much of the information the target system already applied during recovery thereof.

8. The replication system of Claim 6, wherein one of the placement indicators corresponds to a particular portion of the information.

9. The replication system of Claim 6, wherein each placement indicator comprises a sequence number identifying a log file where a particular portion of the information originated.

10. The replication system of Claim 6, wherein each placement indicator comprises a displacement number identifying the displacement within a log file where a particular portion of the information originated.

11. The replication system of Claim 2, further comprising a reader process which reads the information from the source system.

12. The replication system of Claim 2, further comprising a reader queue which stores information read from the source system.

13. The replication system of Claim 2, wherein the replication includes mirroring at least portions of the source system on at least one target system.

14. The replication system of Claim 2, wherein the replication includes load balancing functions based on one of software and hardware configurations of the source and target systems.

15. The replication system of Claim 2, wherein the replication provides broadcast functions.

16. The replication system of Claim 2, wherein the replication provides consolidation functions.

17. A method of recovering or instantiating a target database during replication from a source database to the target database, the method comprising:

creating a target database that has a copy of data from a source database;

logging replication transactions in a replication system wherein the replication transactions are associated with changes made to the source database;

applying the replication transactions to the target database to maintain in the target database a copy of the source database;

identifying an unsynchronizing event associated with the target database;

recovering the target database by rolling back information previously applied to the target database such that the recovered target database contains a copy of at least some of the changes represented by the replication transactions contained in the replication system;

reconciling the recovered target database with the replication transactions contained in the replication system, thereby purging stale replication transactions from the replication system ; and

restarting replication by rolling forward at least some of the information rolled back during the recovery of the target database such that the purged stale replication transactions are not applied during replication and wherein the source database remains available during recovering, reconciling and restarting.

18. The method of Claim 17, further comprising restarting replication.

19. The method of Claim 18, wherein the restarting of the replication includes restarting at least one poster process.

20. (Cancelled).

21. The method of Claim 17, wherein the creation of the copy includes employing a hot backup mode of a database management system of the source database.

22. The method of Claim 17, wherein the recovery of the copy includes employing a database management system associated with the copy.

23. The method of Claim 17, wherein the recovery of the copy includes placing a recovery marker in the recovered copy, thereby identifying a recovery position therein.

24. The method of Claim 23, wherein the placement of the recovery marker occurs substantially near the end of recovering the copy.

25. The method of Claim 23, wherein the reconciling finds the recovery marker and the stale transactions of the information correspond to those transactions that were completed on the source system before the placement of the recovery marker.

26. A method of reconciling transactional information stored in a replication system with a recovered database, the method comprising:

parsing a log file of a recovered database to determine a placement indicator of a recovery flag;

rolling back information previously applied to a recovered database, wherein the recovered database comprises at least some data that is also represented by transaction data that exists in the log file;

reading the transaction data corresponding to changes made to a source database to determine placement indicators of completed transactions;

purging the transactional data when the placement indicator corresponding to the completed transaction occurred before the placement indicator of the recovery flag; and

replicating the transactional data to the recovered database by rolling forward at least some of the information rolled back during the recovery of the recovered database such that the purged transaction data are not applied during replication such that the source database remains available while replicating the transactional data to the recovered database.

27. The method of Claim 26, wherein the transaction data is read from the source database.

28. The method of Claim 26, wherein the placement indicator of the completed transaction comprises a sequence number of a log file of the source database.

29. The method of Claim 28, wherein the sequence number uniquely identifies the log file.

30. The method of Claim 26, wherein the placement indicator of the recovery flag comprises a sequence number of a log file of the recovered database.

31. The method of Claim 30, wherein the sequence number uniquely identifies the log file.

32. The method of Claim 26, wherein the placement indicator comprises a displacement within a log file.

33. The method of Claim 26, wherein the recovery flag is placed by a database management system of the recovered database.

34. A device comprising:

a source system having a source database management system (SDBMS) which governs the storage of data within the source system and creates a log file tracking changes made to the source system;

a target system having a target database management system (TDBMS) which governs the storage of data within the target system and creates a log file tracking the changes made to the target system wherein the target database

management system is configured to recover the target system by rolling back portions of previously applied information; and

a replication system having queues and communicating with the log file of the TDBMS and the log file of the SDBMS, thereby purging from the queues the replication transactions applied after the beginning, but before the completion, of the recovery of the target system, wherein the replication transactions correspond to the changes made to the source system wherein the replication system is configured to roll forward at least some of the information rolled back during the recovery of the target system such that the purged replication transactions are not applied during replication such that the source system remains available during recovery of the target database.

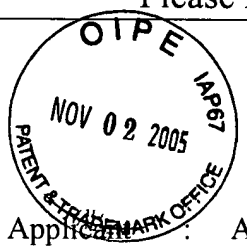
IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.

Please Direct All Correspondence to Customer Number **20995**



TRANSMITTAL LETTER
APPEAL BRIEF

Applicant	:	Aronoff, et al.
App. No	:	09/782,586
Filed	:	February, 12, 2001
For	:	SYSTEM AND METHOD FOR RECONCILING TRANSACTIONS BETWEEN A REPLICATION SYSTEM AND A RECOVERED DATABASE
Examiner	:	Chongshan Chen
Art Unit	:	2162

CERTIFICATE OF MAILING

I hereby certify that this correspondence and all marked attachments are being deposited with the United States Postal Service as first-class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on

10-31-05
(Date)

John R. King
John R. King, Reg. No. 34,362

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Transmitted herewith for filing in the above-identified application are the following enclosures:

(X) Appeal Brief in 31 pages.

FILING FEES:

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FEE TYPE		**FEE CODE**	**CALCULATION**	**TOTAL**
Appeal Brief	*41.20(b)(2)*	1402 ($500)		$500
1 Month Extension	*1.17(a)(1)*	1251 ($120)		$0
2 Month Extension	*1.17(a)(2)*	1252 ($450)		$0
3 Month Extension	*1.17(a)(3)*	1253 ($1,020)		$0
			TOTAL FEE DUE	$500

(X) A check in the amount of $500 is enclosed.

Docket No.	:	QSOFT.010A	**Customer No.: 20,995**
Application No.	:	09/782,586	
Filing Date	:	February, 12, 2001	

(X) Return prepaid postcard.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Dated: October 31, 2005

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